Free Wall Rupture: The Fatal Complication not to Forget

ABSTRACT

Learning Objective: Following a non-revascularized myocardial infarction, a rare complication can occur: free wall rupture. It's important to keep an eye out for this diagnosis when concomitant pericardial effusion is present, even if the patient appears stable initially. We stress the significance of utilizing systematic echocardiography to make a definitive diagnosis.
Case Presentation: A man who had numerous cardiovascular risk factors was admitted with delayed inferior ST-segment elevation myocardial infarction at the age of 65. Upon the performance of bed side echocardiography, it was discovered that he had a rupture of the left ventricular wall with pericardial effusion. The patient's condition deteriorated two hours after admission, leading to his manifesting severe dyspnea and hypotension. After undergoing CPR for 20 minutes, the patient was intubated and resuscitated; he was then rapidly transported to the operating room for immediate exploration. Tragically, the patient suffered another cardiac arrest while in the operating room, and after another hour of resuscitation efforts, he passed away on the table.
Conclusion: Acute and sub acute types of ventricular free wall rupture are both rare, but their impact following myocardial infarction can be catastrophic. Tragically, this phenomenon is the second leading contributor to death in cases of acute myocardial infarct. Although different types of rupture exist, the prognosis is consistently unfavorable.

Keywords: STEMI; Pericardial effusion; MI complications.

1. INTRODUCTION

Tamponade caused by cardiac rupture of the left ventricular free wall is a rare but devastating outcome following a heart attack, often resulting in fatal consequences. The abrupt condition severely alters hemodynamics [1]. For prompt diagnosis, a fast and efficient method like transthoracic echocardiography is necessary. In one instance, our facility received an outpatient referral, who had suffered left ventricular free wall rupture unexpectedly [2].

2. CASE PRESENTATION

65-year-old man was a smoker and hypertensive with no history of coronary artery disease, The man presented in the emergency room with complaints of chest pain for 6 days before his admission. The patient was conscious and physical examination showed heart rate 129 beats/min, blood pressure 110/70 mm Hg, temperature 36.5℃. cardiopulmunary auscultation revealed pulmunary congestion.

Initial electrocardiogram (ECG) showed atrial fibrillation and pathological Q waves in inferior and lateral territory [Fig. 1].

Urgent echocardiography revealed a 18mm cm pericardial effusion, with middly reduced EF45% and hypokinesis of infero lateral and antero lateralwall; the patient recieved diuretic thearpy and dapt; 18h after admission, his condition worsened with severe dyspnea, sweating, and hypotension.
A second Echocardiographic examination performed revealed aggravation of effusion and that myocardium was transmurally detached in diameter of 0.6 cm in the apico-lateral region related to a lv free wall rupture [Fig. 2].

Despite being intubated and resuscitated, the patient's pulses were subsequently lost, prompting 20 minutes of cardiopulmonary resuscitation (CPR). Given their hemodynamic instability, the decision was made to forego percutaneous coronary intervention (PCI) and instead immediately transfer the patient to the operating room (OR) for further examination in an effort to prevent future cardiac arrests. However, while in the OR, another cardiac arrest

occurred. Despite an hour of further resuscitative efforts, the patient's systolic pressure became impossible to generate, ultimately leading to their death on the operating table.

3. DISCUSSION

Reaching as high as 88.2%, LVFWR during a MI is a critical complication. Strangely, sudden out-of-hospital deaths make up more than half of all fatalities linked to LVFWR. It's alarming that medical settings aren't always a factor in these cases [3].

References [4] and [5] highlight the risk factors for LVFWR, which include anterior infarction, delayed PCI, a transmural infarction, and being a female over the age of 70 without any previous history of angina or myocardial infarction. It's worth noting that the order of these factors may differ.

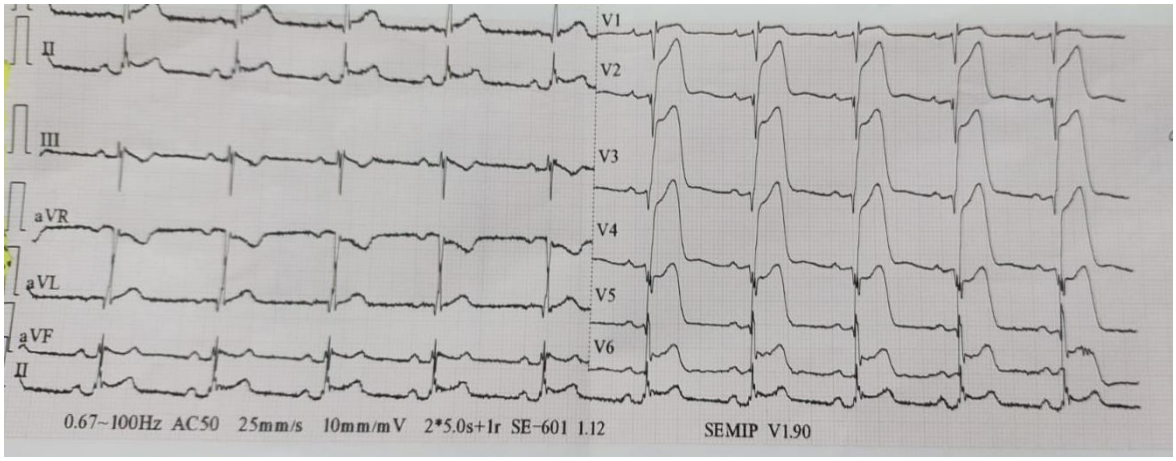
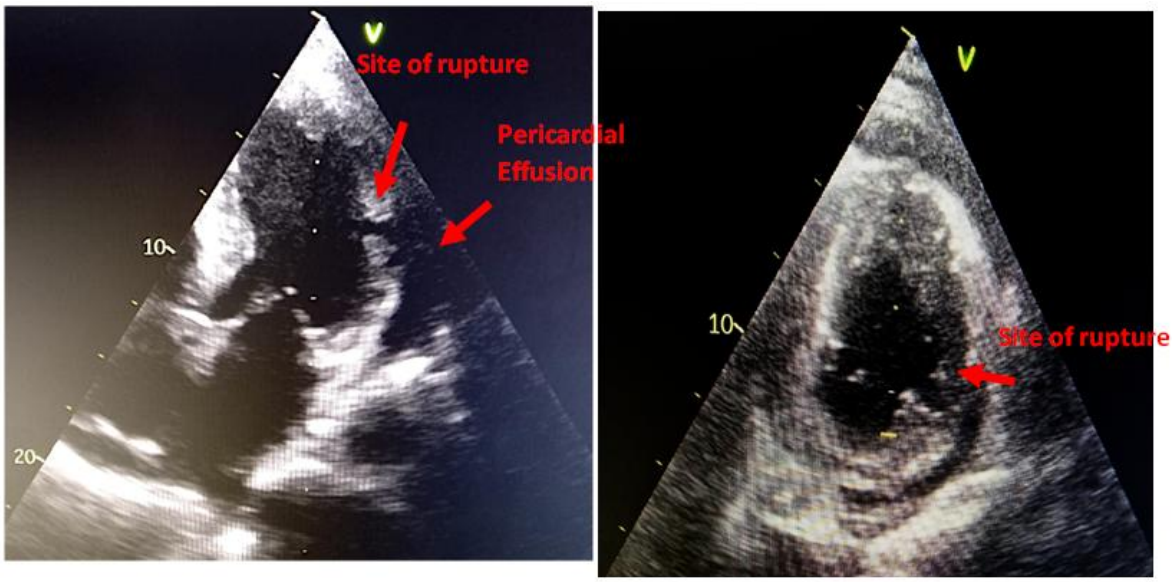


Fig. 1. Atrial fibrillation and pathological Q waves in inferior and lateral territory with ST elevation



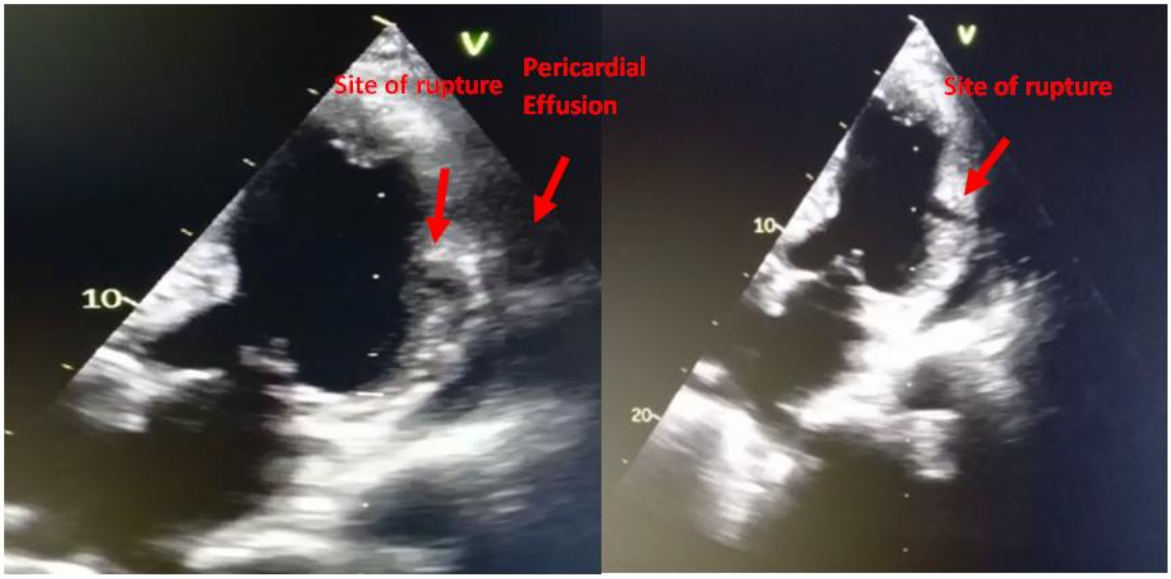


Fig. 2. Transthoracic echocardiography: Myocardial defect in the anterolateral wall, with a serpigionous pattern, associated with pericardial effusion

A categorization scheme has been devised for ruptures, outlining three distinct kinds. The first type, known as acute, results in abrupt death due to significant loss of blood. The second type is subacute, featuring lesser ruptures that may be blocked for a short time by clots or adhesions within the pericardium, offering a window for survival. Lastly, there are chronic ruptures which gradually develop into false aneurysms, marking the third type.

A ventricular pseudoanevrysme may form if the pericardium or an organized thrombus manages to seal a ventricular perforation, resulting in an incomplete rupture. Sudden death from cardiac tamponade is not a concern in this type of rupture unlike in complete ruptures [6]. Meanwhile, the formation of a ventricular pseudoanevrysme is only possible with incomplete rupture [6]. However, sudden death due to hemopericardium is a risk in cases of complete rupture that trigger an LV free-wall rupture [6].

Persistent chest pain, jugular vein distension, syncope, and abnormal sinus tachycardia, ST elevation and new Q-waves on an electrocardiogram are all telltale symproms of myocardial rupture [7].
Various techniques are used to diagnose left ventricular free wall rupture, each chosen independently. Reports show that non-invasive methods can be used to make a diagnosis. Furthermore, quick and precise diagnoses are necessary to ensure the survival of the patient. As for the present case report, the chosen technique was two-dimensional echocardiography [8].

The prognosis for conservative treatment is very poor, [9] thus emergency surgery is preferred. Various surgical techniques have been used in the past including combining prosthetic patch closure with sutures, and resecting infarcted myocardium - both procedures require extracorporeal circulation [10]. However, a new technique that combines a patch with tissue glue has arisen in recent years [11].

In the distant past, Pifarre and other experts declared IABP assistance crucial for survival after surger [12]. Nowadays, it is rare for LVFWR patients to receive this therapy, even though it is still widely embraced for AMI cases where ventricular septal rupture is a complication. Unfortunately, this means that IABP is not part of standard treatment procedures. Our stance is that IABP aid ought to be incorporated into the regular regimen for first-line hemodynamic stabilization, regardless of its limited use in LVFWR situations [13].

4. CONCLUSION

The mechanical risk of left ventricular free-wall rupture is one that could be deadly for those who suffer from acute myocardial infarction. Though it

usually shows up amongst ST-elevation MI patients, infections and trauma are also factors. Proper diagnosis could be achieved through transthoracic echocardiography and heightened intuition. Swift surgical intervention serves as a cure-all, and fluid treatment as well as inotropes and vasopressors could help in the interim.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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